Atty.Docket: 2925-0401P

## What is Claimed is: 1

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A method of producing an acoustic resonator device formed by a piezoelectric material interposed between two conductors on a substrate, comprising:

isolating said piezoelectric material to reduce the amount of acoustic energy which propagates in a lateral direction away from the device.

- The method of claim 1, wherein said isolation of said piezoelectric 2. 1 material is performed during fabrication of the device. 2
- 3. The method of claim 1, wherein said isolation of said piezoelectric 1 material is performed after fabrication of the device. 2
  - 4. The method of claim 1, wherein said step of isolating further includes removing some of all piezoelectric material not involved in signal transmission after device fabrication to limit lateral propagation losses to un-etched regions of the device.
    - 5. The method of claim 4, wherein said step of removing is performed by a selective etching process.
    - The method of claim 1, wherein said step of isolating further includes 6. limiting growth of piezoelectric\material to specified regions on the substrate during fabrication, wherein said specified regions form isolated islands of said piezoelectric material which are subsequently interconnected, thereby limiting the creation or propagation of energy in lateral modes

1	7.\	The method of claim 6, wherein said isolated regions are formed by a
2	masking proc	ess.
1	8.	The method of claim 1, wherein said step of isolating further
2	includes disru	pting crystal orientation of the piezoelectric material during growth of
3	the piezoelec	\ tric material on the substrate by selectively patterning the surface of

- the substrate prior to deposition of the piezoelectric material thereon, so as to form 4
- regions of piezdelectric material where transduction between acoustic and RF 5
- energy is enhanced and regions where this transduction is degraded. 6
- 9. 1 The method of claim 6, wherein any piezoelectric material not interposed between said conductive films is in a region where signal transmission is 2 3 degraded, thereby performing an in-situ isolation function.
- The method of claim 1, wherein said piezoelectric material is selected from the group comprising at least AlN, ZnO and CdS.
- 1 11. The method of claim 1, wherein said conductive films are formed by 2 lithographic patterning of Al metal or other conductors.
- The method of claim 1, wherein said substrate is formed as a plurality of acoutic reflecting layers on a substrate such as a silicon, quartz, or glass wafer.
- 13. A method of isolating an acoustic resonator device having a 1 2 piezoelectric material interposed between two conductors on a substrate, 3 comprising:
- removing some or all piezoelectric material not involved in signal 4 transmission by transduction between RF and acoustic energy after device 5

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fabrication to limit lateral propagation losses to un-etched regions of the device, thereby limiting propagation of energy in lateral modes.

- 1 14. The method of claim 13, wherein said step or removing is performed 2 by a selective etching process.
- 1 15. The method of claim 14, wherein at least some of the substrate 2 surface is removed by selective etching.
  - 16. The method of claim 13, wherein at least some of the removed piezoelectric material forms a void which is back filled with a different material.
- 1 A method of isolating an acoustic resonator device having a 2 piezoelectric material interposed between two conductors on a substrate, 3 comprising:

limiting growth of piezoelectric material to specified regions on the substrate during fabrication, wherein said specified regions form isolated islands of said piezoelectric material which are subsequently interconnected.

- 18. The method of claim 17, wherein said isolated regions are formed by a masking process.
- 19. A method of isolating an acoustic resonator device having a piezoelectric material interposed between two conductors on a substrate, comprising:

disrupting crystal orientation of the piezoelectric material during growth of the piezoelectric material on the substrate by selectively patterning the surface of the substrate prior to deposition of the piezoelectric material thereon, so as to form regions of piezoelectric material where signal transmission is enhanced and regions where signal transmission is degraded.

	20.	T	he method	d of	claim 19,	where	in s	some	e or	all	piezoel	ectric n	naterial
not	interp	osed	between	the	conductiv	e fil	ms	is	in	a	region	where	signal
trans	smissic	omis d	legraded,	there	by perform	ning a	n in	-situ	ı iso	lati	on funct	tion.	

- 21. \ An acoustic resonator device, comprising:
- 2 a substrate;

- a first conductive film formed on the substrate;
- a piezoelectric material layer formed on the first conductive film, wherein said piezoelectric material is isolated to reduce the amount of acoustic energy which propagates in a lateral direction away from the device; and
  - a second conductive film formed on said piezoelectric layer.
- 22. The acoustic resonator device of claim 21, wherein any piezoelectric material not involved in signal transmission is removed by selective etching to limit lateral propagation losses to un-etched regions of the device.
- 23. The acoustic resonator device of claim 21, wherein said piezoelectric material layer is limited to specified regions on said substrate and said first conductive film, forming isolated islands of said piezoelectric material which are subsequently interconnected.
- 24. The acoustic resonator device of claim 21, wherein the crystal orientation of the piezoelectric material is disrupted during growth of said piezoelectric material on the substrate by selectively patterning the surface of the substrate prior to deposition of the piezoelectric material thereon, so as to form regions of piezoelectric material where signal transmission is enhanced and regions where signal transmission is degraded.

The acoustic resonator device of claim 24, wherein any piezoelectric material not interposed between said conductive films is in a region where signal transmission is degraded, thereby performing an in-situ isolation function.

- 1 26. The acoustic resonator device of claim 21, wherein said piezoelectric 2 material is selected from the group comprising at least AlN, ZnO and CdS.
- 1 27. The acoustic resonator device of claim 21, wherein said conductive 2 films are Al metal electrodes or other conductors.
- 1 28. The accoustic resonator device of claim 21, wherein said substrate is 2 further comprised of at least a plurality of reflecting layers on a silicon wafer, or a 3 membrane.